

## PATENT ABSTRACTS OF JAPAN

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(54) LOW ACID DRINK AND ITS PRODUCTION

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## (57)Abstract:

PURPOSE: To obtain a low acid drink capable of preventing deterioration of food due to heat resistant bacteria having spores, excellent in taste and useful for an infusion of parched barley, (milk) black tea, etc., by heating and packing a low acid liquid food containing an antimicrobial emulsifying agent in a prescribed amount into a container.

CONSTITUTION: A low acid liquid food, e.g. brown rice tea or adzuki-bean soup with rice cake, containing 0.0001 to 1% antimicrobial emulsifying agent such as a saccharide fatty acid ester and/or a polyglycerin fatty acid ester is heated and packed into a container such as PET bottle to provide the objective drink.

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LEGAL STATUS

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CLAIMS

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[Claim(s)]

[Claim 1] The manufacturing method of the drink containing a hermetic container characterized by carrying out heating restoration of the subacidity liquefied food which contains an antibacterial emulsifier 0.0001 to 1% at a container.

[Claim 2] an antibacterial emulsifier -- sucrose fatty acid ester -- and -- or the manufacturing method according to claim 1 which is polyglyceryl fatty acid ester.

[Claim 3] The manufacturing method according to claim 2 whose configuration fatty acid of sucrose fatty acid ester is a myristic acid, a palmitic acid, stearin acid, or oleic acid.

[Claim 4] The manufacturing method according to claim 2 whose monoester content of sucrose fatty acid ester is 70% or more.

[Claim 5] The manufacturing method according to claim 2 whose configuration fatty acid of polyglyceryl fatty acid ester is a myristic acid, a palmitic acid, stearin acid, or oleic acid.

[Claim 6] The manufacturing method according to claim 2 whose polyglycerin of polyglyceryl fatty acid ester is 970 or less hydroxyl value.

[Claim 7] The manufacturing method according to claim 1 whose hermetic container is plastic envelopes, such as polyethylene terephthalate, styrene acrylonitrile resin, and vinyl chloride resin, a can, a bottle, a paper carton, an aluminum container, or an aluminum plastics lamination wrapping material container.

[Claim 8] The manufacturing method according to claim 1 whose pH, such as barley tea, tea with whole rice, green tea, roasted tea, oolong tea, \*\*\*\*\* that moves aside, kelp tea, tea, milk tea, black coffee, a cafe au lait, sweet red bean soup with mochi, thick soup, and consomme soup, subacidity liquefied food is 4.6 or more drinks.

[Claim 9] The drink which fills up a PET bottle with the subacidity liquefied food which contains an antibacterial emulsifier 0.0001 to 1%, and changes.

[Claim 10] The drink according to claim 9 whose subacidity liquefied food is a non-emulsifiability transparence drink.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the low-acid beverage which fills up a hermetic container and circulates. It is related with the approach of deterioration not fearing low-acid beverages, such as barley tea and oolong tea, in detail, filling up a PET bottle etc., and manufacturing the drink containing a hermetic container.

[0002]

[Description of the Prior Art] In our country, the canned drink has spread through a commercial scene widely for many years. As contents of the canned drink, the coffee containing milk or sweeteners, the tea containing milk or sweeteners, soup, sweet red bean soup with mochi, etc. are known. although retort heat sterilization for 20 - 40 minutes is performed at about 120 degrees C in these drink canning in order to annihilate the bacteria leading to deterioration and putrefaction -- some strong heat-resistant thermophylic spore bacteria -- retort sterilization in addition -- and it survives, and deterioration accident is caused when heating sale is carried out by a hot vendor etc. On the other hand, pressing down growth of heat-resistant spore bacteria by adding sucrose fatty acid ester, and preventing deterioration is performed widely.

[0003] However, the technique aseptic in recent years spread and the drinks by which normal temperature marketing is carried out to the PET bottle and paper carton other than a canned drink which performed retort sterilization by carrying out aseptic have also increased in number. Although what does not contain a milk component, such as oolong tea, green tea, barley tea, tea, and black coffee, is main as a drink by which aseptic is carried out, recently, aseptic [ of tea with milk, the cafe au lait, etc. ] has come to be carried out.

[0004]

[Problem(s) to be Solved by the Invention] By the tea drink containing a PET bottle which carried out aseptic, elevated-temperature sale is not carried out like a canned drink from the problem on the quality of the material of a hermetic container, and the deterioration by the above thermophylic heatproof spore bearing bacteria does not pose a big problem. However, unlike the canned drink which performs severe METORUTO sterilization (20 or more F0 values) after restoration, the manufacturing method of a PET bottle drink is manufactured at the process which fills up the drink itself with 80-95 degrees C into the container independently sterilized with hot water etc. after carrying out ultraviolet-rays (UHT) sterilization, the usual heat sterilization and. For this reason, at the time of restoration, mesophilic spore bacteria in the air fell, and it mixed, or the mesophilic spore bacteria which did not become extinct on the occasion of container sterilization remained in the drink, and the problem to which sprout growth is carried out in the phase of circulation, and deterioration of the contents drink is carried out has arisen.

[0005] Moreover, also in canned drinks, such as barley tea, when shortening retort sterilization time amount like, the heat-resistant high mesophilic spore bearing bacterium survived comparatively, and there was a problem for which flavor is not spoiled that deterioration tends to occur during circulation in ordinary temperature.

[0006]

[Means for Solving the Problem] In order to solve the above problems, when they repeated

research wholeheartedly, this invention persons were adding an antibacterial emulsifier 0.0001 to 1%, discovered that sprout growth of these mesophilic spore bacteria was controlled, and the deterioration of a drink could be prevented, and resulted in this invention. The emulsifier which has antibacterial [ of sucrose fatty acid ester, polyglyceryl fatty acid ester, mono-glycerol ester, lecithin, enzyme qualification lecithin, etc. ] as an antibacterial emulsifier can be used for explaining this invention below. These may be used independently, may be used by two or more sorts of mixing, or may be used combining other emulsifiers. Also in the above-mentioned antibacterial emulsifier, antibacterial, and a field to the sucrose fatty acid ester and polyglyceryl fatty acid ester of flavor are the most desirable. As for the fatty acid which constitutes an emulsifier, carbon numbers, such as a caprylic acid, a capric acid, a lauric acid, a myristic acid, a palmitic acid, stearin acid, oleic acid, behenic acid, and an erucic acid, can use the fatty acid of the saturation of 8-22, or partial saturation. Especially, a myristic acid, a palmitic acid, stearin acid, and oleic acid are desirable. The thing of an emulsifier of whenever [ low ester interchange ] is desirable, and monoester is most suitable. Especially sucrose fatty acid ester of 70% or more of monoester contents is desirable. If it is in polyglyceryl fatty acid ester, 970 or less thing has the desirable hydroxyl value of polyglycerin. What is necessary is just to let concentration which does not sense the taste of an emulsifier in that case be an upper limit, since bitterness, a chemical smell, etc. may be sensed when emulsifier concentration becomes high although the concentration of an antibacterial emulsifier should just be 0.0001 - 1% (1-10000 ppm) of range. Preferably, it is good to use in 0.001 - 0.05% (10-500 ppm) of range.

[0007] The object liquefied food of this invention is \*\*\*\*\* which is a with a pH of 4.6 or more low-acid beverage, and soup, such as barley tea, tea with whole rice, green tea, roasted tea, oolong tea, \*\*\*\*\* that moves aside, kelp tea, straight tea, tea with milk, black coffee, a cafe au lait, and potage, sweet red bean soup with mochi, etc. mention as an example. This invention is suitable for transparence drinks, such as the barley tea and green tea which do not need especially emulsification and distribution, roasted tea, and oolong tea.

[0008] Containers, such as paper which covered plastic envelopes, such as polyethylene terephthalate, styrene acrylonitrile resin, and vinyl chloride resin, a can, a bottle, plastic film, and aluminum Tomari as a hermetic container of the drink of this invention, are mentioned. Since especially the PET bottle is excellent in transparency, thermal resistance, and a mechanical strength, it is desirable. Although especially the object spore bearing bacterium of this invention is not concluded, generally it is mesophilic spore bacteria in many cases, and, specifically, can consider *B.subtilis*, *B.coagulans*, *B.licheniformis*, *B.circulans*, *B.polymixa*, *Cl.sporogenes*, *Cl.perfringens*, *Cl.pasteurianum*, *Cl.thermaceticum*, *D.nigrificans*, etc.

[0009]

[Example] Although an example explains this invention to a detail below, unless this invention exceeds the summary, it is not limited to this. In addition, the various emulsifiers used for the example are the following table 1 - four kinds of tables.

[0010] (1) Sucrose fatty acid ester (all are the Mitsubishi Kasei food company make)

[Table 1]

表 1

商 品 名 リョートー シュガーエス テル	構成脂肪酸	脂肪酸純度 (%)	モノエステル 含量 (%)	HLB
L-1695	ラウリン酸	95	80	16
M-1695	ミリスチン酸	95	80	16
P-1570	パルミチン酸	80	70	15
P-1670	パルミチン酸	80	80	16
S-1570	ステアリン酸	70	70	15
S-1670	ステアリン酸	70	75	16
O-1570	オレイン酸	70	70	15

[0011] (2) Polyglyceryl fatty acid ester [Table 2]

表 2

乳 化 剤	商 品 名	販 売 会 社	構 成 脂 肪 酸	水 酸 基 価	けん 化 価	HLB
デカグリセリン モノステアレート	SYグリスター MSW-750	阪本薬品	ステアリン酸	560	68	14
デカグリセリン モノパルミテート	DECAGLYN 1-P	日光ケミカルズ	パルミチン酸	610	51	14
デカグリセリン モノミリステート	DECAGLYN 1-M	日光ケミカルズ	ミリスチン酸	620	67	14
デカグリセリン モノオレエート	SYグリスター MO-750	阪本薬品	オレイン酸	560	73	13
ヘキサグリセリン モノステアレート	SYグリスター MS-500	阪本薬品	ステアリン酸	460	88	11
ヘキサグリセリン モノラウレート	SYグリスター ML-500	阪本薬品	ラウリン酸	510	92	14

[0012] (3) Sorbitan fatty acid ester [Table 3]

表 3

商品名	販売会社	構成脂肪酸	水酸基価	けん化価	HLB
ボエム S-60	理研ビタミン	ステアリン酸 パルミチン酸	250	150	5

[0013] (4) Propylene glycol fatty acid ester [Table 4]

表 4

商品名	販売会社	構成脂肪酸	水酸基価	けん化価	HLB
リケマール PP-100	理研ビタミン	パルミチン酸	180	180	4

[0014] Added boiling water 15L to 500g of example 1 granular barley tea, it was made to boil for 5 minutes, and the barley tea drink was obtained. The emulsifier of the specified quantity was added to this, it heated at 90 degrees C, and the PET bottle of 1500ml capacity was filled up. The B.circulans spore (1x10<sup>4</sup> / ml) was immediately inoculated and sealed to this. The existence of deterioration was investigated after saving for 60 days at 37 degrees C. Judged deterioration from the appearance after preservation, a smell, pH, and the number of micro organisms, it showed by "+" what carried out deterioration, and showed what did not carry out deterioration by "-." Moreover, "\*\*" showed "O" and the thing which senses an emulsifier bad smell a little, and the flavor of a drink showed what senses an emulsifier bad smell strong by "x" for the thing equivalent to the original drink of bacillus uninoculation. A result is as being shown in Table 5, and what added the antibacterial emulsifier prevented deterioration.

[0015]

[Table 5]

表 5

乳 化 剤	濃 度 (p p m)	変 敗	風 味
な し	0	+	○
P-1670	0.1	+	○
	200	-	○
	20000	-	×
デカグリセリン モノステアレート	0.5	+	○
	500	-	○
S-1670とデカグリ セリンモノミリステート 2:1の混合物	0.2	+	○
	300	-	○
	15000	-	×

[0016] Added boiling water 15L to 500g of example 2 granular barley tea, it was made to boil for 5 minutes, and the barley tea drink was obtained. The emulsifier of a B.coagulans spore (1x10<sup>5</sup> / ml) and the specified quantity was added to this, and after heating at 90 degrees C and restoration winding up carrying out to a can, it sterilized for 10 minutes at 115 degrees C. This was saved for 90 days at 45 degrees C. The judgment of deterioration was performed like the example 1. Although deterioration of what added the sucrose fatty acid ester which a result is as being shown in Table 6, and is an antibacterial emulsifier, and polyglyceryl fatty acid ester was not carried out, antibacterial was not accepted in sorbitan ester.

[0017]

[Table 6]

表 6

乳 化 剤	濃 度 (ppm)	変 敗	風 味
な し	0	+	○
ソルビタンモノ ステアレート	0.5 2000	+ +	○ ×
○-1570	0.3 300 15000	+ - -	○ △ ×
デカグリセリン モノパルミテート	0.5 700 30000	+ - -	○ △ ×

[0018] 90-degree C water 9L was added to 200g of example 3 green tea, it extracted for 1 minute, and the green tea drink was obtained. The emulsifier of the specified quantity was added to this, it heated at 90 degrees C, and the PET bottle of 1500ml capacity was filled up. The B.subtilis spore (3x10<sup>4</sup> / ml) was immediately inoculated into this, and it saved for 45 days at 35 degrees C. The judgment of deterioration was performed like the example. Although deterioration of what added the sucrose fatty acid ester which is as a result being shown in Table 7, and is an antibacterial emulsifier, and polyglyceryl fatty acid ester was not carried out, antibacterial was not accepted in propylene glycol fatty acid ester.

[0019]

[Table 7]

表 7

乳 化 剤	濃 度 (ppm)	変 敗	風 味
な し	0	+	○
プロピレン グリコール 脂肪酸エステル	0.5 2000	+ +	○ ×
M-1695	0.5 200 20000	+ - -	○ ○ ×
デカグリセリン モノステアレート	0.5 500	+ -	○ ○

[0020] 90-degree C water 2L was added to 45g of example 4 oolong tea, it extracted for 30 seconds, and the oolong tea drink was obtained. The emulsifier of the specified quantity was

added to this and the paper carton which heated at 90 degrees C and laminated the plastic film of 250ml capacity was filled up. The *B.subtilis* spore ( $1 \times 10^4$  / ml) was immediately inoculated into this, and it saved for 45 days at 37 degrees C after seal. The judgment of deterioration was performed like the example 1. A result is as being shown in Table 8, and what added the antibacterial emulsifier prevented deterioration.

[0021]

[Table 8]

表 8

乳 化 剤	濃 度 (ppm)	変 敗	風 味
な し	0	+	○
P-1570	0.8	+	○
	400	-	○
	15000	-	×
デカグリセリン モノミリステート	0.8	+	○
	400	-	○
	20000	-	×
P-1670とデカグリ セリンモノステアレート の1:1混合物	0.5	+	○
	300	-	○
	20000	-	×

[0022] 90-degree C water 2L was added to 45g of example 5 oolong tea, it extracted for 30 seconds, and the oolong tea drink was obtained. The emulsifier of the specified quantity was added to this, it heated at 90 degrees C, and the PET bottle of 1.5L capacity was filled up. The *B.licheniformis* spore ( $5 \times 10^4$  / ml) was immediately inoculated into this, and it saved for 65 days at 30 degrees C after seal. The judgment of deterioration was performed like the example 1. A result is as being shown in Table 9, and what added the antibacterial emulsifier prevented deterioration.

[0023]

[Table 9]



表 9

乳 化 剤	濃 度 (ppm)	変 敗	風 味
な し	0	+	○
S-1670	0.3	+	○
	300	-	○
	10000	-	△
	30000	-	×
ヘキサグリセリン モノステアレート	0.8	+	○
	400	-	○
	20000	-	×

[0024] 90-degree C water 2L was added to 50g of example 6 tea, it extracted for 2 minutes, and the tea drink was obtained. The emulsifier of the specified quantity was added to this, it heated at 90 degrees C, and the bottle container of 200ml capacity was filled up. The B.subtilis spore (5x10<sup>4</sup> / ml) was immediately inoculated into this, and it saved for 60 days at 37 degrees C after seal. The judgment of deterioration was performed like the example 1. A result is as being shown in Table 10, and what added the antibacterial emulsifier prevented deterioration.

[0025]

[Table 10]

表 10

乳 化 剤	濃 度 (ppm)	変 敗	風 味
な し	0	+	○
L-1695	0.2	+	○
	200	-	△
	12000	-	×
ヘキサグリセリン モノラウレート	0.1	+	○
	200	-	△
	15000	-	×

[0026] 90-degree C water 2L was added to 50g of example 7 tea, it extracted for 2 minutes, and the tea drink was obtained. The emulsifier of the specified quantity was added to this, it heated at 90 degrees C, and the PET bottle container of 1500ml capacity was filled up. The B.licheniformis spore (8x10<sup>4</sup> / ml) was immediately inoculated into this, and it saved for 60 days at 37 degrees C after seal. The judgment of deterioration was performed like the example 1. A result is as being shown in Table 11, and what added the antibacterial emulsifier prevented deterioration.

[0027]

[Table 11]

表 11

乳 化 剤	濃 度 (p p m)	変 敗	風 味
な し	0	+	○
P-1670	0.5	+	○
	200	-	○
	15000	-	×
デカグリセリン モノステアレート	0.5	+	○
	500	-	○
	20000	-	×

[0028] The drip extract of the 200g of the example 8 coffee beans was carried out by boiling water 3L, and the coffee drink was obtained. The emulsifier of the specified quantity was added to this, it heated at 90 degrees C, and the plastic envelope of 250ml capacity was filled up. The B.polymixa spore (1x10<sup>4</sup> / ml) was immediately inoculated into this, and it saved for 120 days at 37 degrees C after seal. The judgment of deterioration was performed like the example 1. A result is as being shown in Table 12, and what added the antibacterial emulsifier prevented deterioration.

[0029]

[Table 12]

表 12

乳 化 剤	濃 度 (p p m)	変 敗	風 味
な し	0	+	○
S-1570	0.5	+	○
	300	-	○
	10000	-	△
	20000	-	×
デカグリセリン モノオレエート	0.5	+	○
	150	-	△
	20000	-	×

[0030]

[Effect of the Invention] the subacidity liquefied food prepared by this invention as explained above -- an antibacterial emulsifier -- warming -- the food deterioration by the heat-resistant spore bacteria which mixed during restoration or survived can be prevented. It is effective when filling up a PET bottle with non-emulsifiability transparency drinks, such as barley tea and oolong tea, especially.

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TECHNICAL FIELD

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[Industrial Application] This invention relates to the low-acid beverage which fills up a hermetic container and circulates. It is related with the approach of deterioration not fearing low-acid beverages, such as barley tea and oolong tea, in detail, filling up a PET bottle etc., and manufacturing the drink containing a hermetic container.

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PRIOR ART

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[0003] However, the technique aseptic in recent years spread and the drinks by which normal temperature marketing is carried out to the PET bottle and paper carton other than a canned drink which performed retort sterilization by carrying out aseptic have also increased in number. Although what does not contain a milk component, such as oolong tea, green tea, barley tea, tea, and black coffee, is main as a drink by which aseptic is carried out, recently, aseptic [ of tea with milk, the cafe au lait, etc. ] has come to be carried out.

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EFFECT OF THE INVENTION

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] By the tea drink containing a PET bottle which carried out aseptic, elevated-temperature sale is not carried out like a canned drink from the problem on the quality of the material of a hermetic container, and the deterioration by the above thermophilic heatproof spore bearing bacteria does not pose a big problem. However, unlike the canned drink which performs severe METORUTO sterilization (20 or more F0 values) after restoration, the manufacturing method of a PET bottle drink is manufactured at the process which fills up the drink itself with 80-95 degrees C into the container independently sterilized with hot water etc. after carrying out ultraviolet-rays (UHT) sterilization, the usual heat sterilization and. For this reason, at the time of restoration, mesophilic spore bacteria in the air fell, and it mixed, or the mesophilic spore bacteria which did not become extinct on the occasion of container sterilization remained in the drink, and the problem to which sprout growth is carried out in the phase of circulation, and deterioration of the contents drink is carried out has arisen. [0005] Moreover, also in canned drinks, such as barley tea, when shortening retort sterilization time amount like, the heat-resistant high mesophilic spore bearing bacterium survived comparatively, and there was a problem for which flavor is not spoiled that deterioration tends to occur during circulation in ordinary temperature.

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MEANS

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[Means for Solving the Problem] In order to solve the above problems, when they repeated research wholeheartedly, this invention persons were adding an antibacterial emulsifier 0.0001 to 1%, discovered that sprout growth of these mesophilic spore bacteria was controlled, and the deterioration of a drink could be prevented, and resulted in this invention. The emulsifier which has antibacterial [ of sucrose fatty acid ester, polyglyceryl fatty acid ester, mono-glycerol ester, lecithin, enzyme qualification lecithin, etc. ] as an antibacterial emulsifier can be used for explaining this invention below. These may be used independently, may be used by two or more sorts of mixing, or may be used combining other emulsifiers. Also in the above-mentioned antibacterial emulsifier, antibacterial, and a field to the sucrose fatty acid ester and polyglyceryl fatty acid ester of flavor are the most desirable. As for the fatty acid which constitutes an emulsifier, carbon numbers, such as a caprylic acid, a capric acid, a lauric acid, a myristic acid, a palmitic acid, stearin acid, oleic acid, behenic acid, and an erucic acid, can use the fatty acid of the saturation of 8-22, or partial saturation. Especially, a myristic acid, a palmitic acid, stearin acid, and oleic acid are desirable. The thing of an emulsifier of whenever [ low ester interchange ] is desirable, and monoester is most suitable. Especially sucrose fatty acid ester of 70% or more of monoester contents is desirable. If it is in polyglyceryl fatty acid ester, 970 or less thing has the desirable hydroxyl value of polyglycerin. What is necessary is just to let concentration which does not sense the taste of an emulsifier in that case be an upper limit, since bitterness, a chemical smell, etc. may be sensed when emulsifier concentration becomes high although the concentration of an antibacterial emulsifier should just be 0.0001 - 1% (1-10000 ppm) of range. Preferably, it is good to use in 0.001 - 0.05% (10-500 ppm) of range.

[0007] The object liquefied food of this invention is \*\*\*\*\* which is a with a pH of 4.6 or more low-acid beverage, and soup, such as barley tea, tea with whole rice, green tea, roasted tea, oolong tea, \*\*\*\*\* that moves aside, kelp tea, straight tea, tea with milk, black coffee, a cafe au lait, and potage, sweet red bean soup with mochi, etc. mention as an example. This invention is suitable for transparency drinks, such as the barley tea and green tea which do not need especially emulsification and distribution, roasted tea, and oolong tea.

[0008] Containers, such as paper which covered plastic envelopes, such as polyethylene terephthalate, styrene acrylonitrile resin, and vinyl chloride resin, a can, a bottle, plastic film, and aluminum Tomari as a hermetic container of the drink of this invention, are mentioned. Since especially the PET bottle is excellent in transparency, thermal resistance, and a mechanical strength, it is desirable. Although especially the object spore bearing bacterium of this invention is not concluded, generally it is mesophilic spore bacteria in many cases, and, specifically, can consider B.subtilis, B.coagulans, B.licheniformis, B.circulans, B.polymixa, Cl.sporogenes, Cl.perfringens, Cl.pasteurianum, Cl.thermaceticum, D.nigrificans, etc.

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[Translation done.]

## \* NOTICES \*

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1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.\*\*\* shows the word which can not be translated.

3.In the drawings, any words are not translated.

## EXAMPLE

[Example] Although an example explains this invention to a detail below, unless this invention exceeds the summary, it is not limited to this. In addition, the various emulsifiers used for the example are the following table 1 – four kinds of tables.

[0010] (1) Sucrose fatty acid ester (all are the Mitsubishi Kasei food company make)

[Table 1]

表 1

商 品 名 リョートー シュガーエス テル	構成脂肪酸	脂肪酸純度 (%)	モノエステル 含量 (%)	HLB
L-1695	ラウリン酸	95	80	16
M-1695	ミリスチン酸	95	80	16
P-1570	パルミチン酸	80	70	15
P-1670	パルミチン酸	80	80	16
S-1570	ステアリン酸	70	70	15
S-1670	ステアリン酸	70	75	16
O-1570	オレイン酸	70	70	15

[0011] (2) Polyglyceryl fatty acid ester [Table 2]

表 2

乳 化 剤	商 品 名	販売会社	構成脂肪酸	水酸基価	けん化価	HLB
デカグリセリン モノステアレート	SYグリスター MSW-750	阪本薬品	ステアリン酸	560	68	14
デカグリセリン モノパルミテート	DECAGLYN 1-P	日光ケミカルズ	パルミチン酸	610	51	14
デカグリセリン モノミリステート	DECAGLYN 1-M	日光ケミカルズ	ミリスチン酸	620	67	14
デカグリセリン モノオレエート	SYグリスター MO-750	阪本薬品	オレイン酸	560	73	13
ヘキサグリセリン モノステアレート	SYグリスター MS-500	阪本薬品	ステアリン酸	460	88	11
ヘキサグリセリン モノラウレート	SYグリスター ML-500	阪本薬品	ラウリン酸	510	92	14



## [0012] (3) Sorbitan fatty acid ester [Table 3]

表 3

商品名	販売会社	構成脂肪酸	水酸基価	けん化価	H L B
ボエム S-60	理研ビタミン	ステアリン酸 パルミチン酸	250	150	5

## [0013] (4) Propylene glycol fatty acid ester [Table 4]

表 4

商品名	販売会社	構成脂肪酸	水酸基価	けん化価	H L B
リケマール PP-100	理研ビタミン	パルミチン酸	180	180	4

[0014] Added boiling water 15L to 500g of example 1 granular barley tea, it was made to boil for 5 minutes, and the barley tea drink was obtained. The emulsifier of the specified quantity was added to this, it heated at 90 degrees C, and the PET bottle of 1500ml capacity was filled up. The B.circulans spore (1x10<sup>4</sup> / ml) was immediately inoculated and sealed to this. The existence of deterioration was investigated after saving for 60 days at 37 degrees C. Judged deterioration from the appearance after preservation, a smell, pH, and the number of micro organisms, it showed by "+" what carried out deterioration, and showed what did not carry out deterioration by "-". Moreover, "\*\*" showed "O" and the thing which senses an emulsifier bad smell a little, and the flavor of a drink showed what senses an emulsifier bad smell strong by "x" for the thing equivalent to the original drink of bacillus uninoculation. A result is as being shown in Table 5, and what added the antibacterial emulsifier prevented deterioration.

[0015]

[Table 5]

表 5

乳 化 剤	濃 度 (ppm)	変 敗	風 味
な し	0	+	○
P-1670	0.1	+	○
	200	-	○
	20000	-	×
デカグリセリン モノステアレート	0.5	+	○
	500	-	○
S-1670とデカグリ セリンモノミリステート 2:1の混合物	0.2	+	○
	300	-	○
	15000	-	×

[0016] Added boiling water 15L to 500g of example 2 granular barley tea, it was made to boil for 5 minutes, and the barley tea drink was obtained. The emulsifier of a B.coagulans spore (1x10<sup>5</sup> / ml) and the specified quantity was added to this, and after heating at 90 degrees C and restoration winding up carrying out to a can, it sterilized for 10 minutes at 115 degrees C. This was saved for 90 days at 45 degrees C. The judgment of deterioration was performed like the example 1. Although deterioration of what added the sucrose fatty acid ester which a result is as being shown in Table 6, and is an antibacterial emulsifier, and polyglyceryl fatty acid ester was not carried out, antibacterial was not accepted in sorbitan ester.

[0017]

[Table 6]

表 6

乳 化 剤	濃 度 (ppm)	変 敗	風 味
な し	0	+	○
ソルビタンモノ ステアレート	0. 5	+	○
	2 0 0 0	+	×
O-1570	0. 3	+	○
	3 0 0	-	△
	1 5 0 0 0	-	×
デカグリセリン モノバルミテート	0. 5	+	○
	7 0 0	-	△
	3 0 0 0 0	-	×

[0018] 90-degree C water 9L was added to 200g of example 3 green tea, it extracted for 1 minute, and the green tea drink was obtained. The emulsifier of the specified quantity was added to this, it heated at 90 degrees C, and the PET bottle of 1500ml capacity was filled up. The B.subtilis spore (3x10<sup>4</sup> / ml) was immediately inoculated into this, and it saved for 45 days at 35 degrees C. The judgment of deterioration was performed like the example. Although deterioration of what added the sucrose fatty acid ester which is as a result being shown in Table 7, and is an antibacterial emulsifier, and polyglyceryl fatty acid ester was not carried out, antibacterial was not accepted in propylene glycol fatty acid ester.

[0019]

[Table 7]

表 7

乳 化 剤	濃 度 (p p m)	変 敗	風 味
な し	0	+	○
プロピレン グリコール 脂肪酸エステル	0. 5 2 0 0 0	+	○ ×
M-1 6 9 5	0. 5 2 0 0 2 0 0 0 0	+	○ ○ ×
デカグリセリン モノステアレート	0. 5 5 0 0	+	○ ○

[0020] 90-degree C water 2L was added to 45g of example 4 oolong tea, it extracted for 30 seconds, and the oolong tea drink was obtained. The emulsifier of the specified quantity was added to this and the paper carton which heated at 90 degrees C and laminated the plastic film of 250ml capacity was filled up. The B.subtilis spore (1x10<sup>4</sup> / ml) was immediately inoculated into this, and it saved for 45 days at 37 degrees C after seal. The judgment of deterioration was performed like the example 1. A result is as being shown in Table 8, and what added the antibacterial emulsifier prevented deterioration.

[0021]

[Table 8]

表 8

乳 化 剤	濃 度 (p p m)	変 敗	風 味
な し	0	+	○
P-1 5 7 0	0. 8 4 0 0 1 5 0 0 0	+	○ ○ ×
デカグリセリン モノミリスレート	0. 8 4 0 0 2 0 0 0 0	+	○ ○ ×
P-1 6 7 0とデカグリ セリンモノステアレート の1：1混合物	0. 5 3 0 0 2 0 0 0 0	+	○ ○ ×

[0022] 90-degree C water 2L was added to 45g of example 5 oolong tea, it extracted for 30 seconds, and the oolong tea drink was obtained. The emulsifier of the specified quantity was

added to this, it heated at 90 degrees C, and the PET bottle of 1.5L capacity was filled up. The *B.licheniformis* spore ( $5 \times 10^4$  / ml) was immediately inoculated into this, and it saved for 65 days at 30 degrees C after seal. The judgment of deterioration was performed like the example 1. A result is as being shown in Table 9, and what added the antibacterial emulsifier prevented deterioration.

[0023]

[Table 9]

表 9

乳 化 剤	濃 度 (ppm)	変 敗	風 味
な し	0	+	○
S-1670	0.3	+	○
	300	-	○
	10000	-	△
	30000	-	×
ヘキサグリセリン モノステアレート	0.8	+	○
	400	-	○
	20000	-	×

[0024] 90-degree C water 2L was added to 50g of example 6 tea, it extracted for 2 minutes, and the tea drink was obtained. The emulsifier of the specified quantity was added to this, it heated at 90 degrees C, and the bottle container of 200ml capacity was filled up. The *B.subtilis* spore ( $5 \times 10^4$  / ml) was immediately inoculated into this, and it saved for 60 days at 37 degrees C after seal. The judgment of deterioration was performed like the example 1. A result is as being shown in Table 10, and what added the antibacterial emulsifier prevented deterioration.

[0025]

[Table 10]

表 10

乳 化 剤	濃 度 (ppm)	変 敗	風 味
な し	0	+	○
L-1695	0.2	+	○
	200	-	△
	12000	-	×
ヘキサグリセリン モノラウレート	0.1	+	○
	200	-	△
	15000	-	×

[0026] 90-degree C water 2L was added to 50g of example 7 tea, it extracted for 2 minutes, and the tea drink was obtained. The emulsifier of the specified quantity was added to this, it heated at 90 degrees C, and the PET bottle container of 1500ml capacity was filled up. The

B.licheniformis spore ( $8 \times 10^4$  / ml) was immediately inoculated into this, and it saved for 60 days at 37 degrees C after seal. The judgment of deterioration was performed like the example 1. A result is as being shown in Table 11, and what added the antibacterial emulsifier prevented deterioration.

[0027]

[Table 11]

表 11

乳 化 剤	濃 度 (ppm)	変 敗	風 味
な し	0	+	○
P-1670	0.5	+	○
	200	-	○
	15000	-	×
デカグリセリン モノステアレート	0.5	+	○
	500	-	○
	20000	-	×

[0028] The drip extract of the 200g of the example 8 coffee beans was carried out by boiling water 3L, and the coffee drink was obtained. The emulsifier of the specified quantity was added to this, it heated at 90 degrees C, and the plastic envelope of 250ml capacity was filled up. The B.polymixa spore ( $1 \times 10^4$  / ml) was immediately inoculated into this, and it saved for 120 days at 37 degrees C after seal. The judgment of deterioration was performed like the example 1. A result is as being shown in Table 12, and what added the antibacterial emulsifier prevented deterioration.

[0029]

[Table 12]

表 12

乳 化 剤	濃 度 (ppm)	変 敗	風 味
な し	0	+	○
S-1570	0.5	+	○
	300	-	○
	10000	-	△
	20000	-	×
デカグリセリン モノオレエート	0.5	+	○
	150	-	△
	20000	-	×

[Translation done.]